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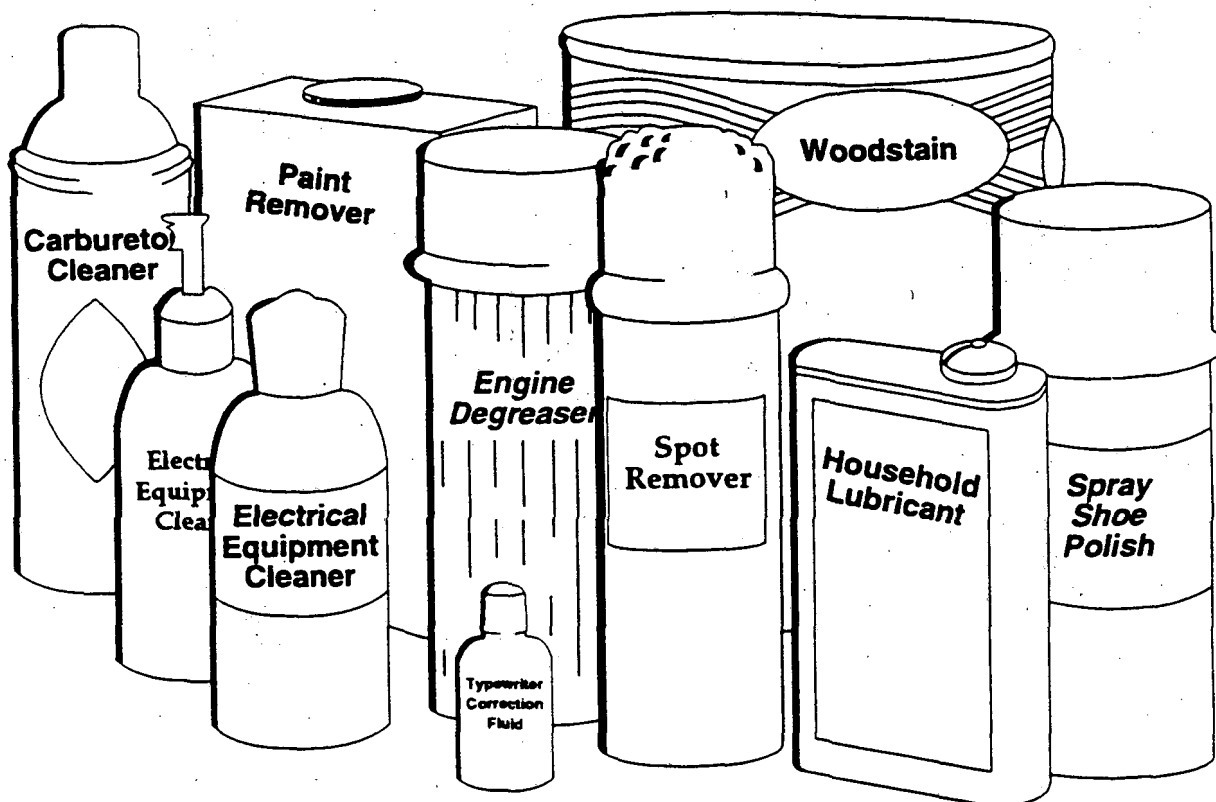
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**EPA**

## **PROJECT SUMMARY**

**Chlorinated Solvents in Consumer Products:  
Laboratory Analyses of Shelf Products  
and  
National Survey of Product Use**





## PROJECT SUMMARY

### **Chlorinated Solvents in Consumer Products: Laboratory Analyses of Shelf Products and National Survey of Product Use**

Two project reports were prepared:

USEPA. 1987. U.S. Environmental Protection Agency, Household solvent products: a "shelf" survey with laboratory analysis. Washington, DC: U.S. Environmental Protection Agency. EPA-OTS 560/5-87-006.

USEPA. 1987. U.S. Environmental Protection Agency, Household solvent products: a national usage survey. Washington, DC: U.S. Environmental Protection Agency. EPA-OTS 560/5-87-005.

#### Authors and Research Team

EPA provided oversight and direction for the project. Principal EPA contributors were Mary Frankenberry, Richard Kent, Patrick Kennedy, Cindy Stroup, Susan Dillman, and Joseph J. Breen of the Exposure Evaluation Division, Office of Pollution Prevention and Toxics.

Principal authors at Westat, Inc. included Donna Eisenhower, David M. Maklan, Stephen K. Dietz, Gary Brown, Paul Flyer, and Skaidrite Fallah. Principal authors at Midwest Research Institute (MRI) included David H. Steele and Thomas M. Sack. This summary was abstracted by George Fisher and Bill Devlin of Westat from the subject reports.

Mass spectral analyses of the shelf products were conducted at MRI. Envirodyne Engineers and Versar analyzed a portion of the products under subcontract to MRI. Concentrations of 25 additional analytes were estimated by MRI for the Environmental Monitoring Systems Laboratory, Office of Research and Development.

Battelle - Columbus Laboratories, as the prime contractor for the product usage shelf survey, provided general contract support through Jean Chesson and Michael Samuhel. Field work for the usage survey was conducted by Westat.

## Summary

Two surveys were conducted in 1987 on the incidence of chlorinated solvents in common household consumer products. Comprehensive technical reports were published at the completion of the studies (referenced above). This summary report was prepared to provide an overview of these studies for a general audience.

In 1986, EPA initiated these surveys of consumer exposures to methylene chloride and its substitutes when using one of the many household cleaning, painting, lubricating and automotive products. Two studies were conducted to provide information on the incidence and concentration of methylene chloride and five other chlorocarbons found in common household products and to obtain estimates of the usage of the products. These studies provided data required to perform consumer exposure analyses for these chlorocarbons.

The first of those studies was a "shelf" study of household solvent products containing methylene chloride and/or any of five other chemical substitutes. The first objective of this study was to determine which categories of consumer products frequently contain the chemical methylene chloride, in particular, and/or one of the five potential substitute solvents: 1,1,1-trichloroethane, trichloroethylene, tetrachloroethylene, carbon tetrachloride, and 1,1,2-trichlorotrifluoroethane. The second objective was to analyze brands representing each product category to determine the concentration of these chemicals in household products. To this end, a national sample of household products was selected and subsequently laboratory tested to determine the incidence and concentration of the six target chlorocarbons.

The laboratory data were also subsequently reanalyzed to determine concentrations of an additional 25 chemicals relating to indoor air pollution. The air pollution results will be included in a forthcoming EPA report.

The results of the shelf survey were used to plan a separate national survey of nearly 5,000 adults in households. The household survey results provided estimates of the frequency and duration of use of products containing methylene chloride and its substitute solvents as well as the conditions of usage, including any protective actions (ventilation)

taken by users. These results provided the EPA's Office of Pollution Prevention and Toxics' (OPPT) Exposure Evaluation Division with inputs for mathematical models of human lifetime exposure to these solvent chemicals. (The Office of Pollution Prevention and Toxics was formerly the Office of Toxic Substances.) Further information on these studies may be obtained from the TSCA hotline (202) 554-1404.

## INTRODUCTION

Methylene chloride and five potential substitute chemicals are part of the family of aliphatic halogenated hydrocarbons. The primary function served by these chemicals in household products is that of a solvent. For instance, methylene chloride is effective in removing all types of surface finishes, including synthetics and epoxies. Methylene chloride is non-flammable and has a rapid evaporation rate. Due to these qualities, the consumer is potentially exposed to methylene chloride and/or its substitutes in a wide variety of household cleaning, painting, lubricating, and automotive products.

In 1985 the National Toxicology Program (NTP) reported positive results for a bioassay indicating that methylene chloride is an animal carcinogen. Subsequently, the Environmental Protection Agency (EPA) made a preliminary determination to list methylene chloride as a "Hazardous Air Pollutant" under section 112 of the Clean Air Act (CAA) and initiated priority review for risks of human cancer from exposures to methylene chloride. An interagency Methylene Chloride Work Group chaired by the then Office of Pesticides and Toxic Substances (OPTS) was formed and charged with the responsibility of conducting the regulatory investigation, which had as its objective to determine whether or not methylene chloride presented an unreasonable risk to human health or the environment, and to determine if regulatory controls were needed to eliminate or reduce exposure. (The former Office of Pesticides and Toxic Substances is now known as the Office of Prevention, Pesticides, and Toxic Substances (OPPTS).)

The investigation revealed that other toxic chlorinated solvents can be used in combination with or as substitutes for methylene chloride. Since

regulating methylene chloride alone could lead to its substitution by these other solvents, the Work Group recommended broadening the regulatory investigation to include five other chlorinated solvents: 1,1,2-trichlorotrifluoroethane, 1,1,1-trichloroethane, carbon tetrachloride, trichloroethylene, and tetrachloroethylene. The solvents were selected on the basis of their large production volumes, their interchangeability, and their known and potential adverse health and environmental effects. The EPA found that there was inadequate information on consumer exposure to these six chlorinated solvents.

The purpose of the shelf and consumer usage studies completed in 1987 was to provide information that would assist in estimating the magnitude of exposure to these solvents from consumer products. The shelf survey involved collecting over 1,200 household cleaning and polishing, painting and lubricating, and automotive products from six cities nationwide. These items were then laboratory tested. The consumer usage survey looked at 30 types of consumer products which contain methylene chloride or its substitutes. Latex and oil based paint, not thought to contain methylene chloride or its substitutes, were added to the consumer survey since they are of interest to EPA for other reasons. The usage survey results included estimates of the frequency and duration of use of products containing methylene chloride and its substitutes and to determine conditions of usage, including any protective measures (ventilation) taken by the users.

A subsequent analytical analysis was performed on the laboratory data to estimate concentrations for an additional 25 chemicals in the household products that had been sampled from store shelves. The target analytes selected for this work include chemicals studied in the Total Exposure Assessment Methodology (TEAM) studies and other analytes recommended by OPPT and other EPA programs. The purpose of these additional tests was to support OPPT and the Office of Air and Radiation (OAR) in their attempts to define pollutants and their levels and sources in indoor air, particularly in residential settings. Also, the Office of Solid Waste and Emergency Response, under the authority of the Superfund Amendments and Reauthorization Act, is concerned with minimizing disposal of household products containing toxic substances.

Two of the six solvents originally under review by the Work Group were subsequently withdrawn from analysis. Carbon tetrachloride was withdrawn because it was no longer used in the major applications under investigation. The solvent 1,1,2-trichlorotrifluoroethane was withdrawn because it was subject to regulation by EPA's OAR as an ozone depletor. The Work Group completed hazard assessments of the remaining four solvents.

On June 21, 1991, the EPA published a preliminary draft list of major sources and area sources of hazardous air pollutants as required under section 112 of the CAA as amended in 1990. Included in this list is methylene chloride and four of the chemical substitutes considered in the studies summarized in this Project Summary report: perchloroethylene (tetrachloroethylene), carbon tetrachloride, trichloroethylene, and 1,1,2-trichlorotrifluoroethane.

## OBJECTIVES

The specific objectives of the studies were:

- To determine which categories of consumer products contain the chemical methylene chloride, in particular, and/or 1,1,1-trichloroethane, trichloroethylene, tetrachloroethylene, carbon tetrachloride, and 1,1,2-trichlorotrifluoroethane.
- To analyze brands representing each product category to determine the concentration of the methylene chloride, or substitute chemicals in household products.
- To analyze previous laboratory data obtained for the six chlorocarbon solvents to estimate concentrations of 25 additional analytes to support other EPA studies of indoor air pollution.
- To conduct a nationwide survey to determine characteristics of consumer use of products containing methylene chloride or its substitutes.

## PROJECT METHODS AND DESIGN

### Shelf Survey

#### Sample Design

A list of consumer products that potentially contain methylene chloride or one of its potential substitute chemicals was first produced based on expert knowledge. EPA then conducted a pilot study in stores around the metropolitan Washington, D.C. area to identify additional products, based in part on label identification of methylene chloride or other chemicals of interest. Then, a shelf survey was conducted in various retail stores in five additional cities across the U.S. This sample of six cities was not selected on a probability basis. Instead, a deliberate attempt was made to represent regions of the U.S. A purposive sample of stores from each city was then visited. Store types visited included: paint stores, hardware/home centers, auto supply stores, department stores, stereo shops, video centers, computer stores, electrical appliance shops, drug stores, grocery stores, art and crafts supply houses, convenience stores, catalog stores, and electronic supply houses. Within each store, a probability sample of brands within product categories was purchased. A total of 1,153 containers of household products was purchased consisting of 1,026 brands. A total of 127 replicates were purchased from different cities to determine whether specific brands differ in the amounts of chlorocarbon across regions of the country.

It is important to note that not all products containing methylene chloride were included in this study. Personal care products, pesticides, and items labelled for professional use only (occupational, not consumer users) were excluded due to overlapping jurisdictions and budgetary considerations.

Some product categories include a relatively small number of brands, while others include a very large number of brands. Large sample sizes were allocated to those product categories having the largest number of brands (aerosol spray paints, paint removers, lubricants, and adhesives).

#### Laboratory Testing

The 1,153 containers were shipped to the laboratory for analysis using the purge and trap procedure described in EPA Method 624 "Purgeables." In general, the product samples were homogenized and approximately 50 mg were removed from the original containers in such a manner that volatiles were completely retained. The samples were then weighed and diluted to a known volume with methanol. Different sample preparation techniques were used for liquids, solids and pastes, and aerosols. The performance of the analytical system was confirmed on a daily basis.

Subsequent computerized analysis of the gas chromatography/mass spectrometry data obtained from the analyses for the six chlorocarbon solvents was made for an additional 25 common chemical components including acetone, benzene, chloroform, and toluene.

#### Quality Assurance

Field sampling procedures included development of a sample frame of store types and random selection of brands within product categories within selected stores. Sampled products were carefully coded to indicate city of selection, product category, container type, and sequence number. All shipments to and from the laboratory were carefully logged in by I.D. coders.

Laboratory testing precision for the six chlorocarbon solvents was assessed by four replicate analyses of a standard mixture prior to sample analysis. In addition, 60 (5%) of the samples were run in duplicate (including duplicate preparation) to assess precision. Samples to be analyzed in duplicate were selected from the data base printout using random numbers. Prior to sample analysis, performance samples containing the six analytes were analyzed to demonstrate the accuracy of the method. The accuracy of the analyses was demonstrated by analyses of 77 samples (7%) spiked with analytes at known concentrations. Samples to be spiked also were selected from the data base using random numbers.

## Usage Survey

### **Survey Methodology**

Based on information gathered in the shelf survey, a nationwide survey of consumer usage of products thought to contain chlorocarbon solvents was made. The main purpose of this survey was to provide usage statistics for each product that can be used to calculate exposure assessment of the U.S. population to methylene chloride and its substitutes. The sample for the survey was generated using a random digit dialing procedure. For each household contacted, the interviewer introduced the study; sought the respondent's participation; asked for the mailing address; and asked for the names of all of the adults in the household 18 years of age and older. This survey used a procedure called the Waksberg Method for implementing random digit dialing (RDD). This method provides an unbiased sample of households with telephones, with most households having the same probability of selection. Moreover, the method is relatively efficient since it requires fewer telephone calls than the earlier procedures developed for RDD.

Next, a questionnaire and a color foldout showing product pictures from the shelf survey were sent to each individual respondent. A pretest finding indicated that each respondent should have received a package separately from other respondents in the same household as a measure to avoid one member filling out each questionnaire for all respondents in the household. The pretest also indicated that the product pictures effectively familiarized the respondents with the products and aided them in answering the questions. This finding was confirmed in the study.

Respondents were asked questions as to their usage of the products. Information included the following:

- Frequency of use of the product;
- Duration of use;
- Brand names of products used;
- Amount of the products used;
- Location of use; and

- Degree of ventilation and other protective measures undertaken when using the product.

Every adult member (18 years of age or older) within a household was included in the survey. Five thousand six hundred and seventy-five (5,675) respondents of 6,700 contacted agreed to participate and therefore were sent a questionnaire. Four thousand nine hundred and twenty (4,920) respondents either sent the questionnaire in or completed the interview during the telephone follow-up.

Finally, a telephone follow-up was made to those who did not respond to the mailed questionnaire within a four-week period. Telephone follow-up at the end of the four-week period was thought to be more effective and efficient than doing a second mailing or making prompting calls, especially since time was an important factor. The written questionnaire was used by the telephone interviewer and the interview took, on the average, twenty to thirty minutes. The mailed questionnaire with product pictures appeared to be a positive influence on the response rate even when the questionnaire was administered over the telephone.

### **Quality Assurance**

The survey involved the design of one questionnaire which addressed consumer use of chemicals contained in an array of products used around the home and in the automobile. Extensive quality assurance procedures were undertaken to assure that valid and reliable data were collected via the questionnaire format. Once the questionnaire was drafted, formal pretests were scheduled. The pretest involved mailing out the questionnaire and doing telephone interviews with nonrespondents.

Quality control was assured during data collection by substantial training of interviewers and receipt clerks, careful supervision and monitoring of the interviewers during the interviewing and the receipt clerks for the mail-ins, and careful handling and storing of the questionnaires. All receipt clerks on the questionnaire mail-in operation received training by the project director. All interviewers used in the telephone follow-ups received general interviewing training and project specific training. All interviews for this survey were assigned to a Telephone Center Supervisor. The supervisor

participated in the training efforts and monitored the interviews once they began. Finally, all the questionnaires were securely stored. The security facilities included a vault where completed questionnaires and other materials were kept.

## RESULTS

### Shelf Survey

Given the nature of the laboratory tests conducted, their lower boundary detection limit of 0.1% by weight (% w/w = 0.1), and the precision of the results, a concentration level of at least one percent (% w/w  $\geq$  1.0) was selected as the classification criterion for the purposes of this study. This criterion was chosen to assure that any product classified as containing one or more of the six target analytes did indeed contain that chemical.

Provided as Table 1 is a summary of the number of product categories and brands which tested positive, by each of the six analytes. The test results demonstrate that at least one of the six target chlorocarbon analytes was found within one or more of the brands for a majority of the household product categories studied. Table 1 shows that 58 percent of the 67 product categories included at least one brand that tested positive on one or more of the analytes. Methylene chloride and 1,1,1-trichloroethane lead the way with one or more of the brands from over one-third of the product categories found to contain these analytes (36 % and 48% of the categories, respectively) at concentrations of at least 1.0 percent. To obtain a better indication of the extent of use of the six target analytes in household products, Table 1 also contains test data summarized by brands. As can be seen, 48 percent of the 1,026 brands sampled were found to contain at least one of the analytes. Again, methylene chloride and 1,1,1-trichloroethane were the most commonly found chlorocarbons.

It should be noted that the results summarized by product category are considered more reliable than those categorized by product brands. This is due to the fact that the "shelf" survey is fairly exhaustive with respect types or "categories" of products (e.g., adhesives, paint removers) that are to be found in many households. However, the set of specific

brands and sub-brands purchased within a product category is not exhaustive of all brands to be found nationwide.

The following findings relate to specific product categories:

- The following categories had the highest percentage of brands with positive results for at least one of the six target analytes: brake quieters/cleaners (92%), typewriter correction fluid (89%); suede protectors (88%), VCR cleaners (86%); and paint removers/strippers (78%) (excluding product categories with less than five brands tested).
- Methylene chloride was found in 78 percent of the paint removers/strippers and 60 percent of the aerosol spray paints tested.
- 1,1,1-Trichloroethane was found in 89 percent of the typewriter correction fluids, 88 percent of the suede protectors, and 67 percent of the brake quieters/cleaners tested.
- Trichloroethylene was found in 78 percent of the typewriter correction fluids tested.
- Tetrachloroethylene was found in 58 percent of the brake quieters/cleaners tested.

An analysis of regional variations of concentrations of chlorocarbon was conducted using a subsample of replicate brands selected for this purpose. In the replicate analysis, some product categories and brands were found to differ significantly across samples on at least one chemical. Approximately 24 percent of the replicated brands were found to have significantly different concentrations of at least one chemical across samples purchased in different regions of the country.

As part of the initial phase of the shelf survey, the labels of the brands purchased in Washington, D.C., were examined to determine whether the listed chemical ingredients indicated the presence of methylene chloride or one of the substitute chemicals. This information was then compared to the laboratory results to determine whether manufacturers are informing consumers about the presence of chlorocarbons in their products. Of the 243 brands compared, 126 were found to contain at least one of the target analytes (52%).

Table 1. Presence of chlorocarbon solvents in household items, summarized by product category and product brand

Analyte	Product Categories		Brands	
	Number of product categories with one or more brands tested positive <sup>1</sup>	Percent of categories (N=67)	Number of brands tested positive <sup>1</sup>	Percent of brands (N=1,026)
Methylene chloride	24	35.8	350	34.1
1,1,2-Trichlorotrifluoroethane	11	16.4	22	2.1
1,1,1-Trichloroethane	32	47.8	145	14.1
Carbon tetrachloride	0	0.0	0	0.0
Trichloroethylene	3	4.5	8	0.8
Tetrachloroethylene	18	26.9	37	3.6
One or more	39	58.2	491	47.9
None	28	41.8	535	52.1

<sup>1</sup> Positive test defined as: % w/w > = 1.0

Of these 126 products, only 71 had labels that indicated the presence of chlorocarbons.

Methylene chloride was mentioned on 36 labels, followed by 1,1,1-trichloroethane (15 labels). Among the 55 insufficiently labeled brands containing chlorocarbons, 1,1,1-trichloroethane was the most frequently found chemical (53%).

The subsequent analysis for the additional 25 analytes revealed that 5 of the target analytes (1,1,2,2-tetrachloroethane, chlorobenzene, styrene, nonane, and d-limonene) were not found (at the 0.1% or greater level) in any of the household products tested. Those analytes found most frequently were acetone, 2-Butanone, cyclohexane, methyl-cyclopentane, hexane, methylcyclohexane, and toluene.

#### Usage Survey

From the shelf product laboratory tests, 30 product types containing methylene chloride and/or its chemical substitute were selected for the usage survey. Two additional product categories (latex paint, oil paint) not containing methylene chloride were added because of interest to EPA.

A summary of the usage statistics by product category using the original questionnaire queries for the 15 highest incidence of use products is presented in Table 2. Highlights of the summary in Table 2, and of other findings, include the following:

- Respondents used an average of seven types of products in their lifetime and an average of five products during the last twelve months.



- The highest incidence of products "ever used" was for contact cements, superglues, and spray adhesives (60.6%). The lowest incidence was for transmission cleaners (2.1%).
- The highest mean number of times a product was used during the last twelve months was for typewriter correction fluid (40.0 times). The lowest incidence of recent use was for outdoor water repellents (2.1).
- The most time spent using products other than latex and oil paint, which are not thought to contain these chlorocarbon solvents was for paint removers/strippers (mean of 125.6 minutes). The least time was for ignition/wire dryers (7.2 minutes).
- The greatest product amount used in units of ounces per year per user other than for latex and oil paint, which would otherwise be the highest (given in mean values), was for outdoor water repellents (148.7 ounces). The least amount used was for typewriter correction fluid (4.1 ounces).
- Most respondents had a window or door open to the outside when using products for large jobs that were done on the inside; most respondents did not have an exhaust fan on when using these products; most respondents kept the door to the room open when using these products; and most people said that they read the directions on the label.
- In general, use of the products decreases with increasing age of the user. Gender differences in use of the products are found with males using lubricants, specialized electronic equipment cleaners, and automotive products more than females, and females using spot removers, solvent type cleaning fluids, wood and paneling cleaners, and typewriter correction fluids more than males.
- Finally, there were no significant differences in the usage results between questionnaires completed by mail and those completed by telephone interview.

The intention in the usage shelf survey was to match the brand the respondents said that they used to the brand laboratory tested as the result of the shelf survey, at least, where a match was

possible. The matches would produce information on the concentration of the chemicals which would then be used in calculations of the exposure assessments of the general population to these six chemicals. However, many brands identified in the user survey were without laboratory data. The thirty products (excluding oil and latex paints) range from a low of 2 percent of the users naming brands with a match in the laboratory data (glass frostings, tints, and artificial snow) to a high of 85 percent (nonautomotive lubricants).

A 'brand imputation' model was developed to provide representative estimates of laboratory data for those brands without actual laboratory data. The brand imputation model is described in detail in the study report.

## CONCLUSIONS

In these studies, EPA's research team:

- Determined that at least one of the six target chlorocarbon analytes was found within one or more brands for a majority of the household product categories sampled.
- Determined that 39 of the 67 product categories included at least one brand that tested positive on one or more of the target analytes.
- Found that carbon tetrachloride was in none of the products tested at the 1 percent concentration (by weight) level.
- Found that concentration of chlorocarbon analyte varies considerably between brands of the same product type.
- Determined that product labels are often inadequate in their specification of chlorocarbon contents.
- Determined that respondents of product usage survey used an average of 7 types of products in their lifetime and 5 products during the last 12 months.

Table 2. Usage survey summary data for 15 highest incidence of use (ever used) products

Question	Product Category <sup>1</sup>														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Percent of respondents used product	60.6	55.2	42.9	39.1	35.8	35.7	35.4	34.9	34.3	30.5	29.9	28.1	25.9	21.9	17.9
Last time used															
Mean months	5.2	16.7	23.2	14.7	20.5	21.5	17.2	12.6	5.0	28.9	30.4	9.9	6.9	13.1	6.3
Median months	1.0	8.0	9.0	3.0	9.0	7.0	6.0	3.0	1.0	12.0	12.0	2.0	0.9	4.0	2.0
Number times used in 12 months															
Mean	8.9	3.9	4.2	15.6	3.5	6.8	4.2	8.5	10.6	3.7	5.7	16.5	40.0	3.8	10.3
Median	3	2	2	3	2	2	2	2	4	2	1	4	12	2	3
Time spent using product															
Mean minutes	15.6	295	117	10.7	14.5	39.4	39.5	74.0	8.1	126	194	29.5	7.6	13.6	9.9
Median minutes	4.3	180	60	5.0	10.0	10.0	20.0	30.0	2.0	60	120	15.0	1.0	7.0	5.0
Time spent in room after using															
Mean minutes	68.9	91.4	93.4	43.7	3.8	32.9	12.7	96.7	84.1	31.4	101	33.3	128	7.5	4.5
Median minutes	10.0	5.0	30.0	5.0	3.0	0.0	0.0	30.0	30.0	0.0	30	3.0	60	0.0	0.0
Size of product															
Mean ounces	7.5	371	65.1	26.3	11.4	69.5	30.7	28.4	9.9	63.7	169	58.1	4.1	22.0	18.6
Median ounces	1.0	256	16.0	5.5	6.0	20.5	13.0	14.0	2.3	32.0	64	16.0	0.9	12.0	6.0
Where used most frequently <sup>2</sup>	OR	OR	OUTS	OR	OR	OUTS	OUTS	OR	OR	OUTS	OUTS	OR	OR	OUTS	OUTS
Window open? (% yes)	41	76	64	45	40	67	63	59	43	71	70	57	26	NA	NA
Fan on? (% yes)	8	16	15	9	8	11	10	11	6	16	16	15	8	NA	NA
Door open? (% yes)	75	85	74	80	73	68	61	83	70	69	77	74	74	NA	NA
Read dir.? (% yes)	70	64	77	77	83	59	73	72	45	80	69	68	39	74	55

<sup>1</sup> Product Category:

- |                                      |                                  |
|--------------------------------------|----------------------------------|
| 1. Contact cement, super glues, etc. | 9. Other lubricants (nonauto)    |
| 2. Latex paint                       | 10. Paint removers, strippers    |
| 3. Wood stains, varnishes, etc.      | 11. Oil paint                    |
| 4. Spot removers                     | 12. Solvent cleaners             |
| 5. Paint thinners                    | 13. Typewriter correction fluids |
| 6. Water repellents                  | 14. Carburetor cleaners          |
| 7. Aerosol spray paint (nonauto)     | 15. Spray lubricants for cars    |
| 8. Wood/floor/paneling cleaners      |                                  |

<sup>2</sup> Where used:

OR Room other than garage, living room, or basement      OUTS Outside

- Determined that the highest incidence of products ever used was for contact cements, superglues, and spray adhesives.
- Found that most survey respondents had a window or door open when using products for large jobs indoors.
- Found that use of these products decreases with person's age.
- Found gender differences in product use.

The two survey reports may be obtained from the National Technical Information Service (NTIS), Springfield, Virginia.

The data files of survey and laboratory data for input to mathematical exposure models may be obtained from EPA through the TSCA hotline (202) 554-1404.

<b>REPORT DOCUMENTATION PAGE</b>	1. REPORT NO. EPA 747-S-93-001	2.	3. Recipient's Accession No.
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7. Author(s) Frankenberry, et al		6.	
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15. Supplementary Notes		11. Contract (C) or Grant (G) No. J1008(0725)-604 68-02-4243	
16. Abstract (Limit: 200 words) <u>Summary Report on Two Studies of Chlorinated Solvents in Consumer Products:</u>  Two surveys were conducted in 1987 on the incidence of chlorinated solvents in common household consumer products. Comprehensive technical reports were published at the completion of the studies. This summary report was prepared to provide an overview of these studies for a general audience.  In 1986, EPA initiated these surveys of consumer exposures to methylene chloride and its substitutes when using one of the many household cleaning, painting, lubricating, and automotive products. The studies were conducted to provide information on the incidence and concentration of methylene chloride and five other chlorocarbons found in common household products and to estimates of the usage of the products.  The chemicals of interest, in addition to methylene chloride, are 1,1,1-trichloroethane, trichloroethylene, tetrachloroethylene, carbon tetrachloride, and 1,1,2-trichlorotrifluoroethane.  A national sample of household products was selected and subsequently laboratory tested to determine the incidence and concentration of the six target chlorocarbons.		13. Type of Report & Period Covered Technical Summary	
17. Document Analysis    a. Descriptors Household Contaminants  b. Identifiers/Open-Ended Terms Consumer products, shelf survey, chlorocarbons, solvents  c. COSATI Field/Group		14.	
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